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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/810,081 | 03/25/2004 | Robert C. West | Q199-US1 | 8213 |

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| EXAMINER | |
|---|---|
| BEST, ZACHARY P | |
| ART UNIT | PAPER NUMBER |
| 1795 | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/810,081 | WEST ET AL. | |
| | Examiner | Art Unit | |
| | Zachary Best | 1795 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *02 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-7 and 38-90* is/are pending in the application.

4a) Of the above claim(s) *38-48 and 55-65* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,49-54 and 66-90* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04122004, 04232004, 05192004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

**ELECTROLYTE INCLUDING POLYSILOXANE WITH CYCLIC CARBONATE GROUPS**

Examiner: Z. Best S.N. 10/810,081 Art Unit: 1795 July 3, 2008

## DETAILED ACTION

1. Applicant's response to the election/restriction requirement filed on April 2, 2008 was received. Invention I, Claims 1-13, 28-37, and 49-54, was elected without traverse. Claims 1 and 49 were amended. New claims 66-90 were added. Claims 8-37 were canceled. Claims 38-48 and 55-65 were withdrawn.

### *Specification*

2. The disclosure is objected to because of the following informalities: page 1, lines 22-24 is missing the information required to relate the application (see "XXX"). Appropriate correction is required.

### *Claim Objections*

3. Claims 50 and 82 are objected to because they are identical in scope. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-6, 49-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lersch et al. (US 5,606,077 A) in view of Kang et al. (US 6,783,897 B2).

Regarding Claims 1, 49, 71 and 81, Lersch et al. teach an electric device (col. 5, line 14) comprising a material including a polysiloxane having one or more backbone silicons linked to a first side chain and one or more backbone silicons linked to a second side chain (col. 2, lines 1-67), the first side chains including a polyalkylene oxide moiety (R1/R5) (col. 2, lines 20-29 and 60-65) and the second side chains including a cyclic carbonate moiety (R2). However, Lersch et al. does not specifically teach the material is used as an electrolyte in an electrochemical device.

Kang et al. teach an an electrochemical device (abstract) comprising a crosslinkable solid polymer electrolyte (abstract) comprising polysiloxane having a polyalkylene oxide group linked to a backbone silicon (abstract), wherein the electrolyte is solid. It is advantageous to use said electrolyte because it has high ionic conductivity at room temperature and can be used in a wide range of electrochemical applications (abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the polysiloxane of Lersch et al. for use as an electrolyte in an electrochemical device because Kang et al. teach the polysiloxane electrolyte can be used in a large variety of electrochemical devices and has high ionic conductivity at room temperature.

Alternatively, simple substitution of one known element for another to obtain predictable results would have been obvious to one having ordinary skill in the art. *See KSR v. Teleflex*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007).

Regarding Claim 2, Lersch et al. teach each of the non-terminal silicons in the backbone of the polysiloxane are linked to at least one side chain selected from a group consisting of a first side chain and a second side chain (col. 2, lines 1-15).

Regarding Claims 3 and 66, Lersch et al. teach the polysiloxane excludes Si-H groups (col. 2, lines 1-37).

Regarding Claims 4, 50, 67, 72, 82, Lersch et al. teach the first side chains include a first spacer positioned between the polyalkylene oxide moiety and the backbone of the polysiloxane and the second side chains include a second spacer positioned between the cyclic carbonate moiety and the backbone of the polysiloxane, the first spacer including one or more $CH_2$ groups and the second spacer including one or more $CH_2$ groups (col. 6, lines 34-50).

Regarding Claims 5, 51, 68, 73, and 83, Lersch et al. teach the polysiloxane having a structure according to General Formula I (col. 2, lines 1-67 and col. 6, lines 40-50).

Regarding Claims 6, 52, 69, 74, and 84, Lersch et al. teach the average molecular weight for the polysiloxane is less than or equal to 3000 g/mole according to the given formula (col. 2, lines 1-67).

Regarding Claims 76 and 86, Kang et al. teach the electrolyte is a solid (abstract).

Regarding Claims 78 and 88, Kang et al. teach the plasticizer (network polymer) interacts with the polysiloxane so as to form an interpenetrating network (col. 8, lines 4-64).

6. Claims 7, 53, 70, 75 and 85 rejected under 35 U.S.C. 103(a) as being unpatentable over Lersch et al. in view of Kang et al. as applied to Claims 1-6, 49-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 above, and further in view of Hosoya (US 2001/0036579 A1).

Lersch et al. in view of Kang et al. teach the electrolyte as recited in Paragraph 5. However, Lersch et al. in view of Kang et al. fail to teach the ratio between the molar concentration of the active oxygens in the electrolyte and the molar concentration of lithium ions in the electrolyte is 5-50.

Hosoya teach a lithium-ion battery comprising lithium ions in an electrolyte (par. 45), wherein the active oxygen should remain as small in concentration as possible because otherwise the active oxygen will begin to decompose the electrolyte (pars. 9-11). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the electrolyte of Lersch et al. in view of Kang et al. wherein the active oxygen concentration was kept as low as possible because Hosoya teach resultant electrolyte decomposition in a lithium ion battery when the active oxygen concentration increases. Discovery of an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272 (CCPA 1980).

7. Claims 54, 77, and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lersch et al. in view of Kang et al. as applied to Claims 1-6, 49-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 above, and further in view of Carlson et al. (US 2002/0092155 A1).

Lersch et al. in view of Kang et al. teach the electrolyte as recited in Paragraph 5. However, Lersch et al. in view of Kang et al. fail to teach the solid polymer includes one or more components selected from the group consisting of polyacrylonitrile, polymethyl methacrylate, polyvinylidene fluoride, polyvinylidene fluoride-co-hexafluoropropylene, polystyrene, polyvinyle chloride, polyalkyl methacrylate, polyalkyl acrylate, styrene butadiene rubber, polyvinyl acetate, and polyethylene oxide.

Regarding Claims 54, 77, and 87, Carlson et al. teach an lithium electrochemical cell (par. 76) comprising an electrolyte, which may be a gel or solid, comprising polysiloxane (pars. 72-73), wherein said electrolyte may be a blend of polysiloxane and polyacrylonitrile (pars. 72-73). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the electrolyte of Lersch et al. in view of Kang et al. wherein the electrolyte is a gel or a solid polymer blend of polysiloxane and polyacrylonitrile because Carlson et al. teach functional equivalency of a gel or solid polymer electrolyte comprising polysiloxane and functional equivalency of a polysiloxane polymer electrolyte and a polysiloxane-polyacrylonitrile polymer electrolyte blend.

8. Claims 79, 80, 89, and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lersch et al. in view of Kang et al. as applied to Claims 1-6, 49-52, 66-69, 71-74, 76, 78, 81-84, 86, and 88 above, and further in view of Lee (US 6,680,147 B2).

Lersch et al. in view of Kang et al. teach the electrolyte as recited in Paragraph 5. However, Lersch et al. in view of Kang et al. fail to teach said network polymer includes a polymethacrylate or polyacrylate.

Lee teaches a lithium battery comprising a polysiloxane electrolyte (abstract), wherein the polysiloxane is combined with a dimethacrylate polymer (network polymer) (col. 8, lines 63-67). It would be advantageous to use the dimethacrylate polymer as a network polymer in the electrolyte because the polymeric electrolyte composition can effectively suppress swelling of the battery due to electrolytic solution (col. 2, lines 30-33).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the electrolyte of Lersch et al. in view of Kang et al., wherein the network polymer is a dimethacrylate polymer because Lee teaches the electrolyte can effectively suppress swelling of the battery due to electrolytic solution.

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

zpb

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795